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## What is claimed is:

1. A method for removing show-through image information from image data generated by scanning a duplex printed document adjacent another document comprising:

receiving the image data for a front side and a back side of the document and an adjacent side of the other document;

determining scanned density data for the front side and effective absorbency data for the combined back and adjacent sides from the received image data;

determining show-through compensated density data for the front side image from the received image data, the scanned density data and the effective absorbency data.

- 2. The method of claim 1, further comprising transforming the show-through compensated density data for one or all of the images into show-through compensated reflectance image data.
- 3. The method of claim 1, wherein determining the show-through compensated density data includes:

spatially filtering the effective absorbency data for at least one of the back or adjacent images; and

subtracting the spatially filtered absorbency data from the scanned density data for the front side image.

- 4. The method of claim 3, wherein the spatial filtering includes using a filter corresponding to a pre-determined show-through point spread function.
- 5. The method of claim 3, wherein the spatial filtering uses a filter corresponding to a show-through point spread function estimated from the scanned data for the three sides.
  - 6. The method of claim 5, wherein the spatial filtering is performed using a digital filter.

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- 7. The method of claim 6, wherein the digital filter is an adaptive filter.
- 8. The method of claim 1, wherein determining the scanned density data for the sides comprises determining a logarithm (or approximation thereof) of the ratio of the received image data for a region of the image bearing substrate containing an image and for a region of the image bearing substrate having no image on either the front or the back sides.
- 10 9. The method of claim 1, wherein the scanned density of the front side is determined using the relationship:

$$D_1^{s}(x,y) = -\ln (R_1^{s}(x,y)/R_p^{w})$$

where ln() denotes the natural logarithm.

10. The method of claim 1, wherein the absorbency of the back and adjacent sides is approximated using the relationship:

$$A_{23}^{e}(x,y) \equiv [1-T_2^{2}(x,y)T_3^{s}(x,y)]$$

where  $T_3^s(x,y)$  and  $T_2^2(x,y)$  are obtained from the scanned data as  $T_3^s(x,y) \equiv R_3^s(x,y)/R_p^w$  and  $T_2^2(x,y) \approx R_2^s(x,y)/R_p^w$ .

11. The method of claim 1, wherein the show-through compensated density data is determined using the relationship:

$$D_1(x,y) = D_1^{s}(x,y) - H(x,y) * A_{23}^{e}(x,y).$$

12. A show-through image information removal apparatus for removing show-through image information from image data generated by scanning an image bearing substrate having a front side image and a back side image, wherein the substrate is adjacent a backing comprising an adjacent side image comprising:

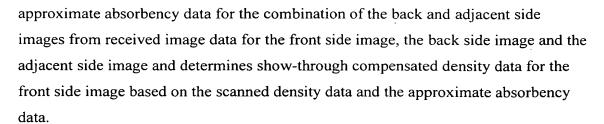
an input/output interface;

a memory; and

a show-through image information compensation device; wherein: image data for the front side image, the back side image and the adjacent side image is received through the input/output interface and stored in the memory, and the show-through compensation device determines scanned density data for the front-side and

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- 13. The apparatus of claim 12, further comprising a data alignment circuit for aligning image data of the front, back and adjacent side images.
- 10 14. The apparatus of claim 13, wherein the show-through image information compensation device comprises:

means for determining scanned density data for the front side image from the received image data for the front side image;

means for approximating an absorbency of the combination of back and adjacent sides and estimating a show-through point spread function;

means for determining show-through compensated density data for the front side from the scanned density data, the approximated absorbencies and the estimated show-through point spread function.

- 15. The apparatus of claim 14, wherein the show-through correction is based on a linearized relationship between the image data for the front, back and adjacent sides.
- 16. The apparatus of claim 14, wherein the estimated show-through point-spread function is estimated using a digital filter.
  - 17. The apparatus of claim 16, wherein the digital filter is an adaptive filter.
- 18. The apparatus of claim 14, wherein the show-through image information compensation device determines the scanned density data by determining a logarithm of a ratio of the received image data of a region having an image on the image bearing substrate and received image data of a region having no image on the image bearing substrate.

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19. The apparatus of claim 12, wherein the normalized reflectance of the back side image is determined by the show-through image information compensation device using the relationship:

$$T_3^{s}(x,y) \equiv R_3^{s}(x,y)/R_p^{w}$$
.

20. The apparatus of claim 12, wherein the absorbency of the combination of back and adjacent sides is approximated by the show-through image information compensation device using the relationship:

$$A_{23}{}^e(x,y) \equiv [1 - T_2{}^2(x,y) T_3{}^s(x,y)]$$
 where  $T_3{}^s(x,y)$  and  $T_2{}^2(x,y)$  are obtained from the scanned data as  $T_3{}^s(x,y) \equiv R_3{}^s(x,y)/R_p{}^w$  and  $T_2{}^2(x,y) \approx R_2{}^s(x,y)/R_p{}^w$ .

21. The apparatus of claim 12, wherein the show-through image information compensation device determines show-through compensated density data by determining the show-through compensated density data using the relationship:

$$D_1(x,y) = D_1^{s}(x,y) - H(x,y) * A_{23}^{e}(x,y).$$

- 22. An image forming device including the show-through image information removal apparatus of claim 12.
- 23. A method for removing show-through image information from image data generated by scanning a duplex printed document, wherein the show-through compensation is based on a linearized relationship between the scanned data
  25 for the front, back and adjacent side images, and wherein the front side image data is in density space.